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# China Report

SCIENCE AND TECHNOLOGY

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5 April 1984

# CHINA REPORT

## SCIENCE AND TECHNOLOGY

### CONTENTS

#### PEOPLE'S REPUBLIC OF CHINA

##### NATIONAL DEVELOPMENTS

- Gratifying Results of Reform Carried Out in Chemistry  
Center  
(Wen Yuankai; RENMIN RIBAO, 17 Jan 84)..... 1

##### APPLIED SCIENCES

- First Chinese-Built Fighter Simulator Described  
(Ri Xin; HANGKONG ZHISHI, No 1, 6 Jan 84) ..... 5
- Table of Contents: ZIDONGHUA YIBIAO No 1, 1984  
(ZIDONGHUA YIBIAO, No 1, 1984)..... 8

##### LIFE SCIENCES

- Health Minister Calls for More Home Medical Care  
(XINHUA, 13 Mar 84)..... 10
- PRC Women's Health Care System Examined  
(XINHUA, 10 Mar 84)..... 11
- Move Towards Extensive Development of Biomedicine  
(Gu Fangzhou; ZHONGGUO YIXUE KEXUEYUAN XUEBAO,  
No 6, Dec 83)..... 12
- Criteria for Bacteria Count for Hospital Studied  
(E. Tingshi; ZHONGHUA YUFANG YIXUE ZAZHI, No 6, 1983)..... 14

Briefs	
Public Health, Disease Prevention	15
Public Health Work Meeting	15

## ABSTRACTS

### ARMAMENTS

BINGGONG XUEBAO [ACTA ARMAMENTARII], No 1, Feb 84.....	16
--	----

### ASTRONAUTICS

YUHAN XUEBAO [JOURNAL OF THE CHINESE SOCIETY OF ASTRONAUTICS], No 1, 1984.....	17
---	----

### BLAST INJURY

ZHONGHUA WAIKE ZAZHI [CHINESE JOURNAL OF SURGERY], No 12, Dec 83.....	20
--	----

### COMPUTERS

ZHONGNAN KUANGYE XUEYUAN XUEBAO [JOURNAL OF CENTRAL- SOUTH INSTITUTE OF MINING AND METALLURGY], No 4, Dec 83.....	21
--	----

### CONTRACEPTIVES

YAOXUE XUEBAO [ACTA PHARMACEUTICA SINICA], No 11, 29 Nov 83.....	22
--	----

### ELECTRONICS

DIWEN WULI [ACTA PHYSICA TEMPERATURAE HUMILIS SINICA], No 3, 1983.....	23
---	----

### GEOLOGY

KUANGWU XUEBAO [ACTA MINERALOGICA SINICA], No 3, 1983.....	24
--	----

### HIGH ENERGY PHYSICS

WULI XUEBAO [ACTA PHYSICA SINICA], No 2, 1983.....	25
--	----

### INDUSTRIAL TECHNOLOGY

NEIRANJI GONGCHENG [CHINESE INTERNAL COMBUSTION ENGINE ENGINEERING], No 3, 1983.....	26
DIWEN WULI [ACTA PHYSICA TEMPERATURAE HUMILIS SINICA] No 3, 1983 .....	26

## LASERS

WUSUN JIANCE [NONDESTRUCTIVE TESTING], No 5, 1983..... 27

TONGJI DAXUE XUEBAO [JOURNAL OF TONGJI  
UNIVERSITY] No 4, 1983 ..... 27

## MEDICINE

ZHONGGUO YIXUE KEXUEYUAN XUEBAO [ACTA ACADEMIAE MEDICINAE  
SINICAE], No 1, 15 Feb 84..... 28

## NATIONAL DEVELOPMENTS

### GRATIFYING RESULTS OF REFORM CARRIED OUT IN CHEMISTRY CENTER

Beijing RENMIN RIBAO in Chinese 17 Jan 84 p 3

[Article by Wen Yuankai [3306 0337 0418], director of the Chemistry Teaching and Research Center, Chinese Science and Technology University: "We See the Dawn of Reform"]

[Text] For 1 year we have conducted experiments for the reform of the educational system in our chemistry teaching and research center. During this year, our reforms were aimed at the following three questions that most urgently await solution in the science, technology and educational sector:

- 1) Science, technology and education have become seriously detached from production, economic and social development.
- 2) The need to bring into play the initiative of our intellectuals. Due to the long years of "Leftist" influences, the enthusiasm, intelligence and wisdom of our intellectuals have so far not yet been fully mobilized and developed. This is a huge waste of national "wisdom" and "capability." At the same time, the enthusiasm of our science and technology personnel is to a certain degree adversely affected and suppressed by shortcomings in our personnel system, labor system and distribution system, which in our actual working conditions have brought about the iron rice bowl (system of appointments for life), the big common pot (egalitarianism) and the departmental ownership of personnel (immobility).
- 3) The need to improve pay, health, working and living conditions of our intellectuals, especially of the middle-aged core personnel.

One year's practice has proved to us that the following points are the most effective measures to bring about improvements:

- 1) Experts as managers. We instituted a system of director's responsibility for the affairs of the teaching and research center, did not appoint a deputy director and appointed only one secretary. We thereby eliminated such shortcomings as overlapping of administrative authorities, shifting responsibilities, quarrelling over trifles and mutual interferences.
- 2) Initial introduction of mobility of personnel. In the past, our teaching and research center was well known as a unit beset with serious and long-standing

problems. After we embarked on our experimental reforms, we transferred three of our staff, engaged or borrowed some specialists, teachers and administrative personnel to work with us concurrently and had also quite a number of our teachers work concurrently at other places.

3) Extension of self-determination. We tentatively made the three sectors, work, personnel and finance, into one organic whole and created a unity of responsibility, authority and benefits. In teaching and research, we unified management, work assignment, distribution and other dispositions concerning social service work, personnel transfers, technical cooperation, economic management, laboratory construction, etc.

4) Improvement of quality of instruction, reform of educational ideology. Our teaching and research center has now 20 members (2 associate professors, 8 lecturers, 6 assistant professors and 4 teaching assistants). Apart from teaching general chemistry and experimental chemistry classes for 360 students from non-chemistry faculties throughout the university, 90/chemistry/ students in the classes of calculations in chemistry and machine operations and teaching 120 students from the Hefei United University in general experimental chemistry classes, we have 15 graduate students to take care of, a truly heavy load of instruction.

To raise the quality of instruction, we improved general experimental chemistry instruction and compiled new experimental teaching materials. We are now also in the process of improving classroom instruction, expanding lectures on special subjects, using instructional methods which employ electrical audio-visual aids, plan checks on the instructional capability of teachers and plan the institution of a work responsibility system. As to the reform of educational ideology, we are putting forward the idea that the development of the students' abilities and creative powers should replace the present educational ideology of merely transmitting knowledge, as the primary purpose of education. We initiated the organization of research meetings for scholarly creativity and instructional creativity. We are trying to gain experience in ways of fostering the seven capabilities in students (capability for creative invention, scientific research, organizing and managing, of keeping well informed and for excellence in eloquence and verbalization).

At our university we also organized extracurricular research groups among the students, trying out a system of scientific research for the students of this faculty, to foster their ability for independent work.

5) Invigorating scientific research. We attach importance to the development of instructional and scientific research capabilities (including capability for basic scientific research and research in applied technologies) in our teachers, development of the capability to bring research results to everyone's notice and the capability of developing new products.

Apart from having undertaken research in calculating chemistry and in the coordination theory, we are also charged with the study of certain items of applied chemistry by the Anhui Provincial Committee on Science, such as the study of

rape oil reforming techniques, the emulsification of diesel oil, the effective components in medicinal royal jelly, etc. Among these research topics, important results have already been achieved, and appraised, in the reduction of erucic acid in rape oil and the preservation of nutrients in oils.

6) Directing efforts toward society and the production sector. Our teaching and research center conducts various kinds of technical cooperation with more than 10 factories and enterprises in Anhui, Jiangsu, Shanghai, Beijing and Hubei, developing new products for them, training qualified personnel, providing scientific and technological information and improving techniques. In cooperation with such units as the provincial science consultative committee and the Bureau of Agricultural Machinery, we established in the Hefei area a "Zhenhua Center for the Training and Development of Agricultural Modernization," with technical training classes for rural specialized households on such topics as chicken farming, raising earthworms, growing mushrooms and rapid electroplating. Altogether more than 600 persons have participated in these courses, which have received a warm welcome from the broad masses of our peasants. We also conducted two training classes for the East China power system, instructing in water quality analysis and trained more than 60 technicians qualified to do laboratory analyses.

7) Increasing economic benefits for the teaching and research center. During the past year, we received more than 50,000 yuan of income through our activities in technical fields and in the service to society. We used the income, first of all, to expand reproduction, to purchase a microprocessing system for over 30,000 yuan and one recorder, to build two new laboratories, to pay our teachers, staff and workers a monthly book purchasing allowance and in addition we turned over 10,000 yuan to the university. Next, we used the money to raise the income of teachers, staff and workers. At present, many of our core personnel receive an additional science and technology allowance of 30-50 yuan. Other personnel are also paid additional 10-15 yuan. We issued allowances without egalitarianism and also had no appraisals by the masses, but had the amounts determined by our director, after his having collected reactions from various quarters. I assess myself always at the lowest rate.

8) Raising administrative efficiency. We appointed one full-time secretary for our teaching and research center, which thereby eliminates much legwork and attendance to odds and ends formerly required by our teachers. We also paid attention to the use of tele- and other communications, duplicating techniques and other methods useful for instructional and scientific research activities, thus modernizing all our administrative work.

In short, our "game of chess" has been much invigorated by our reforms, and the whole section changed from the former state of spiritless stagnation to one of collective dynamic vitality.

We have merely just taken our first step in the reform of our system of scientific and technological instruction and are still in the state of groping to find better solutions. Many comrades and colleagues in China and even abroad gave us encouragement and support.



However, our reform still has to overcome many difficulties and obstructions. We meet with much "cold irony and hot satire," also suffer from rumors and slander, and are even restricted by certain policies and traditional viewpoints. Our requests for further personnel mobility is met with references to so-called growing "concrete difficulties."

During the First Session of the Sixth National People's Congress, I spoke about our reform to a leading comrade: we don't ask for one cent of government money, we also don't demand additional staff from our superior authority, all we want is an "O.K." from the leadership. Certain leading comrades in the Central Committee have repeatedly expressed to us their support. However, reform is not always plain sailing, and the "O.K." has in the meantime also been watered down somewhat. We ardently hope the leadership at all levels and the departments concerned will support us one step further and will widely propagate the reform of science instructions, this great undertaking of liberating the sector of productive forces which are lodged in our intellectuals.

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CSO: 4008/123

FIRST CHINESE-BUILT FIGHTER SIMULATOR DESCRIBED

Beijing HANGKONG ZHISHI [AEROSPACE KNOWLEDGE MAGAZINE] in Chinese No 1,  
6 Jan 84 pp 4-5

[Article by Ri Xin (2480 2450)]

[Text] Last October, the first Chinese-built fighter simulator was certified by the government for operation by the Air Force.

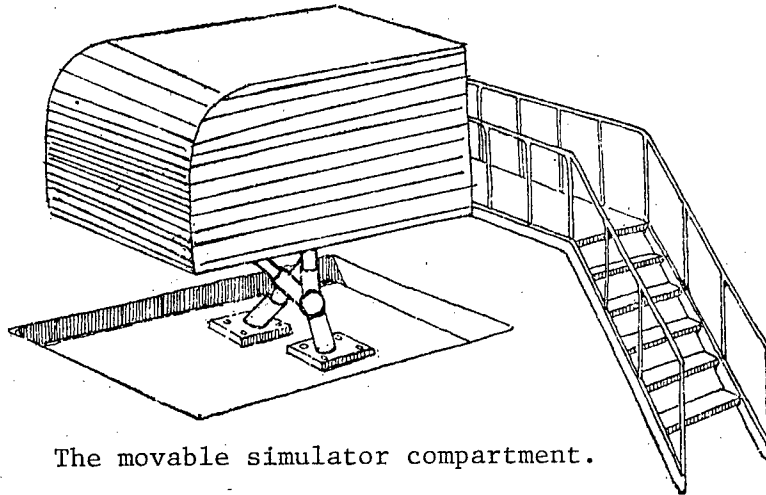
Filled with excitement, this author was accompanied by members of the simulator office to conduct a thorough inspection tour of the simulator. This inspection tour left him with a deep impression of the technological achievements made jointly by the Beijing Aeronautical Institute, the Shuguang Electric Motor Factory, and the Beijing Precision Machine Research Institute, and of the level of sophistication of the flight simulator.

A Five-Minute "Tour in the Sky"

The flight simulator is composed of three parts: (1) the computer system, which is located in the computer room, the main machine room, and the visual scenery room; (2) the mobile simulator cabin; and (3) the visual scenery production system. The main machine room is the "front stage" of the simulator "theater," where flight instructors conduct their teaching and command duties and student pilots receive their flight training. The first thing that meets the eye as one enters the main machine room is a huge structure that resembles a "mobile house" being supported in midair. This is the pilot's work room--the mobile simulator cabin. It is under the control of a motion system which has 3 degrees of freedom: vertical, pitch, and roll.

On the left side of the main machine room is a flight command console. The console not only has the same instruments as those in the cabin, it also has television monitors showing the scenery seen by the pilots, and many rows of control buttons. Through the command console, flight instructors can perform the functions of teaching, commanding, and testing the student pilots.

For the purpose of giving me a first-hand understanding of the simulator operation, my host escorted me up to the simulator cabin to observe a life-like take-off and landing flight demonstration. During the demonstration, the cabin is in darkness except for the midsection where a pilot is seated in the cockpit mock-up of a Chinese-built fighter. A large screen in front of the cockpit shows the entire scene of the airport: blue sky, a wide runway extending into the distance, and buildings, structures, and other ground facilities.



The movable simulator compartment.

Suddenly, my host announced: "Please pay attention, the aircraft is now ready to take off." A few moments later, I heard the sound of engines being started; then the aircraft began to roll forward, and moved swiftly down the runway. Sensing that my body was being forced slightly backward, I realized that the aircraft had already left the ground. Then, as the aircraft began its climb, the scenery on the screen turned into miles of blue sky.

"The aircraft is now making a turn." As I looked down, I saw a beautiful picture of criss-crossing railroads and rivers, and vaguely visible villages.

"The aircraft is now descending." The airport began to appear in the distance, and the runway and taxiway came into view. Aiming straight toward the runway, the aircraft slowly descended; then, sensing a slight vibration, I heard the sound of rubber tires touching the ground. The aircraft had landed. My watch indicated that the whole flight took only 5 minutes, but during this short time, we flew up and down, and I was given a realistic "tour in the sky."

Afterwards, the host comrade gave a detailed explanation of the operating principle of the mobile cabin. The scenery we saw was projected onto the screen by the visual scenery production system; the sound came from the speakers (computer-controlled) located in the rear of the cabin. The cockpit layout and configuration were identical to those of the fighter aircraft. Here the pilot can experience the same visual, touch, hearing, and acceleration sensations as in an actual flight. The pilot can perform not only basic take-off and landing exercises, but many other flight maneuvers including cloud penetration, flying under nighttime and adverse weather conditions, as well as trouble elimination maneuvers. The horizontal and vertical flight path parameters are recorded on the flight path recorder located next to the command console. The wide-margin line printer located in the computer room can print several dozen flight parameters per second, and provide a complete record of the flight data.

#### The Secret of "Artificial Scenery"

Next, we visited the "back stage" of the flight simulator--the visual scenery room, where "natural scenery" is created. In the middle of the room stood a huge ground scenery model plate, and a light box of equal area (containing hundreds of fluorescent light bulbs) for illumination. In front of the ground

scenary model is a mobile stand equipped with a television camera and an optical probe. This probe was actually the "eyes" of the pilot. The "artificial scenery" was transmitted to the pilot in the following sequence: "ground scenery model--optical probe--camera--projector--large screen."

A closer examination of the ground scenery model shows that it is pieced together from dozens of small plates. The entire surface of the plate is like a giant sandbox which contains airfields, farmland, rivers, mountains, villages, and oceans. It can provide the pilot with a visual range of several dozen square kilometers. A sculpture of this magnitude is a remarkable piece of art work.

On one side of the visual scenery room is the visual scenery control console, which has a television monitor for direct observation of the visual scenes sent to the pilot.

#### "Nerve Center of the Simulator"

The flight simulator has many complex and sophisticated systems and components. The central unit which coordinates the over-all operation is a computer system.

Walking into the bright and spotless computer room, one sees rows of equipment operating in an orderly manner. A comrade working in the computer room explained to me that this equipment may be divided into three categories: digital computer, real-time interface, and software. They constitute the "nerve center" of the simulator.

The function of the digital computer is to perform real-time calculations and control for various systems of the simulators; the real-time interface is to perform data exchange between the digital computer and the peripheral systems; and the software consists of mathematical models and programs. There are 12 subsystems: the flight subsystem, the engine, the power supply, the radio, the hydraulic system, the fuel system, the control load system, the sound system, the motion system, the visual scenery system, the trouble detection system, and the management system. The programs are written in compiler language. The above description illustrates the complexity and importance of the "nerve center."

This tour gave me a general understanding of the performance and the technical standard of this Chinese-built flight simulator.

After the tour, I said good-bye to the comrades who designed and created this large simulator. However, the excitement remained with me for a long time. Now that the first simulator had been built in this country, I am sure there will be many more to follow in the near future. They will play an increasing part in the construction of China's national defense and in the development of China's scientific research efforts.

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CSO: 4008/117

## APPLIED SCIENCES

### TABLE OF CONTENTS: ZIDONGHUA YIBIAO NO. 1, 1984

Shanghai ZIDONGHUA YIBIAO [PROCESS AUTOMATION INSTRUMENTATION] in Chinese  
No 1, 1984

#### [Text] Table of Contents

#### Comprehensive Survey

Taking New Steps and Making New Contributions  
(Wang Liangmei)..... 1

Present Status of Microprocessors' Applications in Transmitters  
(Ling Kenu)..... 3

#### Research Report

Finite Element Calculation of Elastic Components in Parallel-  
Beam Transmitters  
(Xu Duoqing, Wang Dongyan)..... 7

An Investigation of Measurements of Rotational Speed, Torque  
and Power in Power Equipments  
(Gu Yuancheng, Zhou Kaichuan)..... 11

The Voltage Sensitivity and Non-Linear Error of a Measuring  
Bridge  
(Wang Jisan)..... 14

#### Products and Applications

Numerical-Controlled Flowmeter Utilizing Electronic Calculator  
(Ling Zhaoyuen)..... 17

Automatic Measurement of High-Temperature Softening Property  
of Iron Ore  
(Li Yinghau)..... 20

An Analysis of Applications of d/p Transmitters in Petro-  
Chemical Process Measurements  
(Wu Guoliang)..... 23

## Standard and Quality

Quick Graphic Processing of Experimental Data for Accelerated Life Test (Ling Qing).....	25
--	----

## Experience Interflow

Methods of Improving the Recording Accuracy (Wang Wuquan, Ye Chuanrong).....	28
---	----

The Human Error of Reference Junction Temperature Compensation in Calibrating the Thermometric Electronic Potentiometer (Wu Weiliang).....	29
--	----

A Portable Tester for Silicon-Controlled Trigger (Fei Zaocheng).....	31
---	----

Some Comments on the Improvement of DTL Electronic Controller (Wang Jianrui).....	32
--	----

## Technical Courses

"Applications of Electronic Process Systems" Chapter IV. Auto-Manual Switching and Automatic Following (Yu Jicheng, Zhan Jihong).....	33
---	----

"The Selection of Control Valves" Chapter I. Selection of the Construction Type of Control Valves (Liu Wenzheng).....	36
---	----

News Window.....	42
------------------	----

Abstracts of Main Articles in This Issue.....	46
---	----

CSO: 4008/182

LIFE SCIENCES

HEALTH MINISTER CALLS FOR MORE HOME MEDICAL CARE

OW130236 Beijing XINHUA in English 0210 GMT 13 Mar 84

[Text] Beijing, 13 March (XINHUA)--Treating chronically ill people at home has proved successful in 100,000 cases in 14 provinces and municipalities last year and the number is expected to expand to 2 million in the coming 5 years.

This was declared by public health minister Cui Yueli in an interview with XINHUA.

Many chronically ill people suffering from paralysis, illnesses that come with old age and bone fractures in the recuperation stage have difficulty in going to hospitals for treatment. And their hospitalization would cut down the turnover of hospital beds which are in short supply. Getting treatment at home cuts down medical bills, and is psychologically sound for the patients.

The present task, the minister said, was to ensure that every hospital with the conditions does so. These hospitals should be equipped with mini-portable medical equipment.

Since July 1983, 94 hospitals in Shanghai have given regular home treatment to 4,700 chronically ill patients. This includes regular check-ups and prescriptions, injections, wound dressing and even X-ray check-ups.

Beijing now treats 2,950 patients at home, mostly patients of internal medicine, traditional Chinese medicine, patients taking acupuncture and those recuperating after surgery.

In Xinyang Prefecture, Henan Province, old cadres, pensioners and childless old people are given special regular treatment at home by the prefectural hospital of traditional Chinese medicine.

Similar home treatment is being given in Hubei, Zhejiang, Yunnan and Guizhou Provinces. A Suixian County hospital in Hubei reported 90.9 percent effectiveness of such treatment.

Even in remote Tibet, the practice is now being initiated by the Xigaze hospital.

## LIFE SCIENCES

### PRC WOMEN'S HEALTH CARE SYSTEM EXAMINED

OW100704 Beijing XINHUA in English 0644 GMT 10 Mar 84

[Text] Beijing, 10 March (XINHUA)--Nearly 3,000 hospitals and clinics have been set up throughout China to provide specialized medical care for women and children.

The country now has 2,800 provincial, city, county and commune hospitals and clinics for women and children, in addition to general hospitals with similar departments. The women and child care network extends to villages, where 400,000 female paramedics and 500,000 rural midwives are active.

The centers have helped factories and mines set up regulations and facilities to protect women workers' health and instituted regular checkup programs which reduced deaths from cervical cancer in Beijing from 1,104 per million 10 years ago to 164 per million in 1982.

Since prenatal medicine was started in the 1970s, 26 Chinese provinces, municipalities and autonomous regions in the country have laboratories and ultrasonic equipment for prenatal checkups to help identify and prevent genetic diseases or congenital deformities.

Better women and child care has brought the country's infant mortality rate down to 12 per thousand in urban areas and 20 to 30 per thousand in rural areas, compared with 200 per thousand before 1949. Deaths caused by childbirth also dropped to 5 per 10 thousand from 150 per 10 thousand in 1949.

Many provincial hospitals and women's health centers offer premarital counselling for young couples and advice on family planning.

CSO: 4010/61



## LIFE SCIENCES

### MOVE TOWARDS EXTENSIVE DEVELOPMENT OF BIOMEDICINE

Beijing ZHONGGUO YIXUE KEXUEYUAN XUEBAO [ACTA ACADEMIAE MEDICINAE SINICAE]  
in Chinese No 6, Dec 83 pp 334-335

[Article by Gu Fangzhou: "March Towards the Extensive Development of Biomedicine"--article published in English]

[Text] The purposes of the First Symposium on Lymphocytic Hybridoma sponsored by the Chinese Academy of Medical Sciences and held on 17th September, 1983, were to review the achievements of this research work in the past year, to exchange experiences among workers in the same specialty, and to promote further development of this very important field of research.

During the past year, encouraging advances have been attained in the study of lymphocytic hybridoma undertaken in this Academy; so far, more than 20 types of lymphocytic hybridoma have been established. Among them, B lymphocytic hybridoma was most abundant, from which more than 100 strains of monoclonal antibodies (McAb) have been isolated. The antiviral McAb consisted of virulent and vaccine strains of the 3 types of poliomyelitis virus, encephalitis B Virus, dengue fever virus type IV, and virus of renal syndrome (epidemic hemorrhagic fever). They have all been used in the antigenic analysis of viruses, diagnosis and experimental therapy, wherefrom certain results have been acquired. In the field of parasites, several strains of McAb against *Schistosoma japonicum* have been secured and used in the determination of their common antigen of this parasite in its different developing stages. By using *Plasmodium murine* as antigen, we have got McAb against human malignant and tertian malaria, one strain of which showed cross-reaction with *P. falciparum* occurring in South America, Thailand and Africa, hence suggesting that it may become a standard antibody for the determination of the antigens of malignant malaria in various areas of the world. Two strains of McAb, when inoculated into mice, could protect the animal from the attack of *P. murine*. We have also got strains of McAb against *Leishmania* which causes kala-azar in Xinjiang province.

In the respect of McAb against various immunological components in the human serum, we have succeeded in preparing McAb with the quality of anti-human IgG, IgM and IgA, which have been employed in the analyses of the structures

and subclasses of IgG and IgA. Besides, we also obtained McAb with anti-human complement G3.

Research on anti-mycotoxin has promoted the successful preparation of McAb of anti-favatoxin which has been used in the study on the etiology of liver carcinoma. McAb against triphosphoglyceraldehyde dehydrogenase on human erythrocyte membrane and McAb against bovine insulin have also been prepared successfully. These two strains of McAb have significant values for theoretical and practical application.

It is rejoicing to state that work on T lymphocytic hybridoma has been started and obtained T hybridomas with T helper activity and antigenic specificity, and MAF-secreting as well as anti-MAF hybridomas.

Although we have achieved some progress in this research, it can only be regarded as the first step of our endeavor when compared with the rapid development of this biotechnology abroad. Henceforth, we should try to further develop and popularize this new technique in order to accelerate the study on human and murine lymphocytic hybridomas. We must try to explore the method of effective immunization in vitro to disclose the law of cell-fusion, to establish rapid and simplified screening and identifying techniques, and to further the research on the physical and chemical properties and purification of McAb. It is also necessary to actively carry out practical therapy, in order to make clear the way of application of McAb in passive immunization and immunosuppressive treatments.

In the applied basic researches of biomedicine, we should employ the lymphocytic hybridoma technique as extensively as possible, in order to obtain more McAbs against hormones, differentiating antigens of immune cells and major histocompatibility antigens etc, for the purpose of making worthy contributions to the solution of the key problems of pathogenesis, early diagnosis, treatment and prophylaxis of grave disorders, such as tumors, cardiovascular diseases, immunodeficiencies, hereditary diseases, infectious diseases and endocrinic diseases.

CSO: 4010/62

CRITERIA FOR BACTERIA COUNT FOR HOSPITALS STUDIED

Beijing ZHONGHUA YUFANG YIXUE ZAZHI [CHINESE JOURNAL OF PREVENTIVE MEDICINE]  
in Chinese No 6, 1983 p 341

[Article by E. Tingshi [6759 1694 0099] et al.: "Criteria of Bacteria Count in 'Emission Standards of Polluted Water From Hospital'--Confirmation Tests for the Total Number of B. Coli Group"]

[Summary] Thirty-six samples of polluted water and 117 samples of disinfected polluted water (containing 6-8 mg/l residual chlorine) discharged from infectious diseases hospitals were examined for the total number of B. Coli group and enteropathogenic bacteria, and physical and chemical tests were carried out on the disinfected polluted water. The results showed that the incidence of enteropathogenic bacteria increased as the total number of B. Coli increased in the polluted water. Enteropathogenic bacteria were detected in 3 samples of the disinfected polluted water, two of which contained 501-16,000/l in total number of B. Coli group, and one contained 330/l in total number of B. Coli group. The physical and chemical tests showed that 74% and 54.5% of the samples examined exceeded the National Standards in pH and in COD respectively. However, it was reported elsewhere in our country that no enteropathogenic bacteria had been detected in polluted water from general, tuberculosis and infectious diseases hospitals when residual chlorine in the disinfected polluted water accorded with the National Standards.

The fact that enteropathogenic bacteria were detected in one of our samples with total number of B. Coli at 330/l seemed to be related to the unsatisfactory effect of disinfection due to the decreased water temperature in the cold weather, in addition to the serious pollution of the water.

We can thus conclude from above that the total number of B. Coli group should be confined to 500/l in emission standards of polluted water discharged from hospital.

CSO: 5400/4124

BRIEFS

PUBLIC HEALTH, DISEASE PREVENTION--Beijing, 12 March (XINHUA)--China will train more people for disease prevention and public health for the goal of "health for all by the year of 2000," according to Minister of Public Health Cui Yueli. He has urged all medical colleges to set up public health facilities, and secondary health schools to run such classes. China now has only 300,000 medical workers in disease prevention. Main attention will continue to be on the rural areas where 80 percent of the population live. Public health and disease prevention must suit the developments of rural construction, such as industrial and side-line production, education, environmental sanitation and hygiene, as well as family planning, he said. The anti-epidemic network at the county, commune and brigade levels should be developed. Plans for control and elimination of various infectious and endemic diseases, by stages and in groups, should be worked out, he added. [Text] [OW120910 Beijing XINHUA in English 0711 GMT 12 Mar 84]

PUBLIC HEALTH WORK MEETING--At the provincial conference on public health work, responsible comrades of the Hubei CPC Committee and government, including Guan Guangfu, Huang Zhizhen, Qian Yunlu, and Liang Shufen pointed out: To create a new situation in public health work in our province this year, it is necessary to implement the principle of regarding prevention as the main task, to improve the quality of medical services, to carry out activities of running hospitals in a civilized way, and to pay close attention to maternal and child hygiene. The responsible comrades of the provincial CPC Committee and government stressed that public health is an important matter concerning the four modernizations program, the protection of productive forces and the quality of the nation and, therefore, the party committee and governments at all levels must attach importance to, show concern for, and support the development of public health work. The provincial conference on public health work opened on 1 March and closed this afternoon. The participants discussed and studied the measures for public health work this year, in line with the speeches given by the responsible comrades of the provincial CPC Committee and government and in the light of conditions in the province. [Text] [HK080338 Wuhan Hubei Provincial Service in Mandarin 1100 GMT 7 Mar 84]

# ARMAMENTS

AUTHOR: HU Huanxing [5170 3562 1840]  
LI Dejun [2621 1795 0193]  
CHEN Shiyu [7115 0013 6877]

ORG: None

TITLE: "A Technical Calculation Method for Shaped Charges"

SOURCE: Beijing BINGGONG XUEBAO [ACTA ARMAMENTARII] in Chinese No 1, Feb 84  
pp 1-11

TEXT OF ENGLISH ABSTRACT: The present calculation method involves all the geometric parameters for the cartridges of shaped charges and their liners as well as the density, detonation velocity and multiple power index of explosives. When collapse and jet parameters are calculated, incompressible flow models are adopted. Collapse velocity is calculated on flat plate projectile model and is modified by the results of cylindrical cohesive collapse tests. Penetration is calculated in accordance with quasi-steady process, and the effects of target strength and break-up of jets are also considered. The calculated results of collapse parameters of various charges, jet parameters and penetration process indicate that calculated values are in perfect compliance with real values.

Applying this program (JPGS program), we cannot only calculate various parameters for the available charges, predict the performance of newly-designed charges, but also quantitatively analyze the rules of effects of charge parameters varied on penetration.

AUTHOR: ZHANG Housheng [1728 0624 3932]  
ZHANG Shanshan [1728 3790 3790]

ORG: None

TITLE: "A Study of the Application of the Characteristic Value of Explosives as the Energy Output Index"

SOURCE: Beijing BINGGONG XUEBAO [ACTA ARMAMENTARII] in Chinese No 1, Feb 84  
pp 36-42

TEXT OF ENGLISH ABSTRACT: This paper sets forth the concept for the characteristic value (C.V.) of explosives and its calculation method. And equations of the C.V. for detonation velocity, detonation pressure, specific dynamic energy of detonation products, specific impulse, dent depth, ballistic mortar test, specific dynamic energy of cylinder test, shaped charge penetration depth, Gurney velocity, and flying-plate velocity are also derived. Compared with the known methods, the equations of the C.V. have considerable advantages. We think that the energy output index of explosives have functional relation with the detonation parameters and explosion work. The C.V. of explosives has met the preparatory requirements for energy output index, hence it can be used as the energy output index of explosives.

ASTRONAUTICS

AUTHOR: WANG Gongzhi [3076 1872 6347]  
WANG Dehan [3769 1795 3352]  
ZHAO Yuanhuai [6392 0337 3232]  
YU Yaoyong [0205 1031 8982]

ORG: None

TITLE: "The Relationship Between Human Tolerance and Cardiovascular Function to Lower Body Negative Pressure"

SOURCE: Beijing YUHANG XUEBAO [JOURNAL OF THE CHINESE SOCIETY OF ASTRONAUTICS] in Chinese No 1, 1984 pp 1-7

TEXT OF ENGLISH ABSTRACT: The relationship between tolerance and cardiovascular function of human to lower body negative pressure was studied in 27 young healthy male subjects. The results revealed that individual differences of cardiovascular function can be induced during the action of lower body negative pressure. Above all, both strong or weak cardiovascular regulative capacity among those subjects can be discriminated. The cardiovascular functional state of aircrews or astronauts can be evaluated by this physiological method of stress.

AUTHOR: SHAN Yunsheng [0830 0061 3932]

ORG: None

TITLE: "A Nonlinear Self-adjusting Digital Filter, a Linear Nonrecursive Digital Filter as Compensator of Attitude Control of Flexible Vehicles"

SOURCE: Beijing YUHANG XUEBAO [JOURNAL OF THE CHINESE SOCIETY OF ASTRONAUTICS] in Chinese No 1, 1984 pp 36-43

TEXT OF ENGLISH ABSTRACT: In this paper a nonlinear self-adjusting digital filter and a linear nonrecursive digital filter are investigated on the basis of earlier papers (SHAN Yunsheng: "Investigation of a Nonlinear Digital PD Type Compensator," XINXI YU KONGZHI [INFORMATION AND CONTROL] No 4 1981, and SHAN Yunsheng: "Nonrecursive Digital Filter for Vehicle Attitude Control" XINXI YU KONGZHI [INFORMATION AND CONTROL] No 3 1980). Both of these filters serve as compensators of attitude control of flexible vehicles. The algorithm for the nonlinear self-adjusting digital filter has been simplified and improved in comparison with that reported in the first article above. The self-adjusting characteristic has, in addition, been redesigned for a flexible vehicle. In this paper the algorithm as well as the estimation of the computing operations are given. Also, the results of a digital simulation show that the control effect of the filters in question is very good.

AUTHOR: WANG Zicai [3769 1311 2088]  
QUAN Taifan [2938 1132 5400] et al.

ORG: None

TITLE: "Fast Descent Control Research"

SOURCE: Beijing YUHAN XUEBAO [JOURNAL OF THE CHINESE SOCIETY OF ASTRONAUTICS]  
in Chinese No 1, 1984 pp 24-29

TEXT OF ENGLISH ABSTRACT: Based on Lyapunov's stability theory, the paper, according to the concept of optimal control contour time surface, has developed the design scheme for a sub-optimal time control system, which is easy to realize in engineering and solved problems of sub-optimal time control of high-order linear system.

The scheme has been applied to fulfill the design for the fast descent control system of a certain vehicle, which makes considerably improved the performance of the system; simplified the design work and achieved satisfactory results.

AUTHOR: ZHAO Shaokui [6392 1421 1145]

ORG: None

TITLE: "An Analysis and Measurement Method for Thrust Line Deviation of Launch Vehicle"

SOURCE: Beijing YUHAN XUEBAO [JOURNAL OF THE CHINESE SOCIETY OF ASTRONAUTICS]  
in Chinese No 1, 1984 pp 81-86

TEXT OF ENGLISH ABSTRACT: In this paper, an engineering method for calculating thrust line deviation of launch vehicles is established, a method for the evaluation of thrust line deviation of launch vehicle based on telemetering information from flight test is presented and ground measurement methods of rocket-motor thrust line deviation are approached.

CSO: 4009/60

AUTHOR: XUE Deyong [5641 1795 6978]  
WU Shuchu [0702 2562 0443]

ORG: None

TITLE: "A Study of the Antenna Beam Correction of Sea Surface Scattering Coefficient at Normal Incidence"

SOURCE: Beijing YUHAN XUEBAO [JOURNAL OF THE CHINESE SOCIETY OF ASTRONAUTICS] in Chinese No 1, 1984 pp 8-18

TEXT OF ENGLISH ABSTRACT: The analytical expressions derived from the composite random surface scattering theory are presented in this paper for calculating sea surface scattering coefficient in the quasi-specular region, and the theoretical values for this coefficient are thus obtained at three typical frequencies in K, X and C band respectively, revealing a result, which is contrary to the conventional conclusion, that under the same conditions the real scattering coefficient of the sea decreases with the increase of the radar frequency. The antenna beam correction for the measured scattering coefficient at normal incidence, operated in the beamwidth-limited mode and pulsewidth-limited mode, is then based on this theoretical sea surface scattering signature and the radar equation. Correction values are computed for several beamwidths at the same frequencies over a range of surface wind speeds from 1 m/sec to 18m/sec, and an experimental verification is made for 13.9 GHz. It is further shown that the correction value for narrow beamwidth can also be applicable to any kinds of land terrain. The conclusions drawn from this study not only are important to the development of algorithms and the extraction of information but also provide a sound basis for determining some parameters of airborne- and spaceborne-radar altimeter.

AUTHOR: JIN Xuekuan [6855 1331 1401]

ORG: None

TITLE: "A Vector Method for Calculating Received Radiation Angle Coefficients of Near-earth Spacecraft"

SOURCE: Beijing YUHAN XUEBAO [JOURNAL OF THE CHINESE SOCIETY OF ASTRONAUTICS] in Chinese No 1, 1984 pp 69-80

TEXT OF ENGLISH ABSTRACT: In this paper, a method to calculate the received radiation angle coefficients of near-earth spacecraft is presented. Under certain assumed conditions, the calculation of the external thermal current of near-earth spacecraft becomes a calculation of three radiation angle coefficients: the direct solar radiation angle coefficient, the earth infra-red radiation angle coefficient and the reflected solar radiation angle coefficient by the earth. The calculation formulas are derived by the vector analysis and coordinate transform and are expressed by the trajectory and attitude parameters of the spacecraft, which can be given or be telemetered. In this paper, the presented method may be used not only for realtime calculating of the external thermal current of the near-earth spacecraft with changing or unchanging territory but also can be used for predicting infra-red radiation characteristics of the near-earth space object.



## BLAST INJURY

AUTHOR: CHEN Qihong [7115 0796 7703]  
TONG Xingjie [4547 2502 2638]  
ZHAO Yundong [6392 7189 2767]

ORG: All of People's Liberation Army Hospital No 174

TITLE: "Analysis of 30 Cases of Blast Injury"

SOURCE: Beijing ZHONGHUA WAIKE ZAZHI [CHINESE JOURNAL OF SURGERY] in Chinese  
No 12, Dec 83 p 773

TEXT OF ENGLISH ABSTRACT: The authors discussed the pathogenesis and management of blast injury based on their personal experience in 30 cases and a brief review of the literature. Most likely, the lung lesion is produced directly by the explosive wave propagated through the air passages. An increased air-way resistance is an important early sign of pulmonary injury, hence for early diagnosis and monitoring the wound, X-ray examination and gas analysis of the arterial blood are essential. Rapid, shallow respiration and early hemoptysis indicate a grave situation. Within 24-48 hours following the injury, the patient's condition usually worsens with the aggravation of pulmonary edema, so intravenous infusion should be restricted. However, overrestriction of parenteral fluid is not advisable for patients with shock or associated injuries, rather the amount of fluid should be estimated on the basis of urine volume and chest signs. The use of respirator is required only in those having a  $pO_2$  of below 60 mmHg and  $pCO_2$  of above 55 mmHg after conventional oxygen therapy, to which the majority respond satisfactorily. There were 3 deaths in the present series.

CSO: 4009/43

## COMPUTERS

AUTHOR: CHEN Songqiao [7115 2646 0829]  
YANG Mingtai [2799 2494 3141]

ORG: Both of Department of Automation Central-South Institute of Mining and Metallurgy

TITLE: "Microcomputer Graphic (With Chinese Characters) Processing Software"

SOURCE: Changsha ZHONGNAN KUANGYE XUEYUAN XUEBAO [JOURNAL OF CENTRAL-SOUTH INSTITUTE OF MINING AND METALLURGY] in Chinese No 4, Dec 83 p 29

TEXT OF ENGLISH ABSTRACT: This paper introduces the principle, structure and working way of a graphic (with Chinese characters) processing software on an EXO (NOBUS) microcomputer with a simple graphic display and a printer. The software was developed by the Central-South Institute of Mining and Metallurgy. The present paper includes: 1. The principle of graphic transfer directly between memory, disk, graphic memory and printer; 2. The method of adding Chinese characters to graphic while graphic is edited; 3. The principle and method of input, formation, process, and rotation of regular graphic (straight, rectangle, broken line, arc, trigonometric function, and symmetrical diagram); 4. The drawing method of irregular graphic; 5. The method of magnification change of background color and piecing together in a graphic print.

CSO: 4009/39

## CONTRACEPTIVES

AUTHOR: HAN Guangdian [7281 1684 3949]  
HUANG Qiulai [7806 4428 0171]

ORG: Both of Institute of Materia Medica, Chinese Academy of Medical Science, Beijing

TITLE: "Synthesis of an Oral Contraceptive Quingestanol"

SOURCE: Beijing YAOXUE XUEBAO [ACTA PHARMACEUTICA SINICA] in Chinese No 11, 29 Nov 83 p 864

TEXT OF ENGLISH ABSTRACT: Quingestanol (I) is a potent progestational agent with prolonged activity, and is used as an oral contraceptive. It was formerly obtained in 4 steps from 19-norandrost-4-en-3, 17-dione (V). We wish to report now the synthesis in two steps from dione (V) by etherification with cyclopentanol, triethyl orthoformate and a catalytic amount of p-toluenesulfonic acid followed by ethynylation with sodium acetylide and concomitant acetylation. When dione (V) was treated with the same ethynylation-acetylation procedure, 17 $\alpha$ -ethynyl-19-nortestosterone-3,17-diacetate (VII) was obtained, thus the supposition<sup>(9)</sup> made previously was verified that the  $\Delta^4$ -3-one in (V) was enolized to  $\Delta^{3,5}$ -diene-3-ol ion (VIII) during ethynylation. The enol acetate (VII) could be converted into quingestanol (I) according to the method reported.<sup>(6)</sup>

CSO: 4009/38

ELECTRONICS

AUTHOR: SUN Yuping [1327 3022 1627]  
LIANG Junhou [2733 0193 0624]  
GE Huang [5514 3874]  
LIANG Jiuchun [2733 0036 2504]

ORG: Institute of Semiconductors, Academia Sinica

TITLE: "The Fabrication of Nb-Notorys Microbridge by Using SEBL"

SOURCE: Beijing DIWEN WULI [ACTA PHYSICA TEMPERATURAE HUMILIS SINICA] in  
Chinese No 3, 1983 pp 244-247

TEXT OF ENGLISH ABSTRACT: This paper presents the technique of making Nb-  
Notorys microbridge with submicron bridge width by using scanning electron  
beam lithography (SEBL).

CSO: 4009/18

GEOLOGY

AUTHOR: XU Guofeng [1776 0948 7364]  
SHAO Jielian [6730 3381 6647]  
FENG Shuzhuang [6265 3219 8369]  
ZUO Dahua [1563 1129 5478]

ORG: Wuhan Geological Institute

TITLE: "A Study of Tennantite From a 'Carlin-type' Gold Deposit, Shanxi, China"

SOURCE: Guiyang KUANGWU XUEBAO [ACTA MINERALOGICA SINICA] in Chinese No 3, 1983 pp 175-182

TEXT OF ENGLISH ABSTRACT: Systematic data on morphological characteristics, chemical composition, crystal structure, physical property, infrared spectrum, coefficient of thermoelectricity, reflectivity, reflection color indices, unit cell dimensions, decrepitation temperature and sulfur isotopes are given for tennantite from a "Carlin-type" gold deposit in Shanxi Province, China. These lines of evidence support the "transmissive hot brine" genesis of gold deposits and provide further prospecting indicators for gold.

AUTHOR: DING Weifan [0002 4850 5672]

ORG: Northwest Geological Brigade, Sichuan Provincial Geological Bureau

TITLE: "Sellaite From Kangding, Sichuan Province"

SOURCE: Guiyang KUANGWU XUEBAO [ACTA MINERALOGICA SINICA] in Chinese No 3, 1983 pp 193-197

TEXT OF ENGLISH ABSTRACT: In the study area, sellaitite occurs in the Au-bearing multimetal veins of hydrothermal gold deposits and often coexists with native gold, bornite, galena, pyrite, bournonite, geocronite, quartz, fluorite, etc.

Sellaite is white in color and shows a glassy luster. It is allotriomorphic granular (0.5-2 mm in size) or columnar (5-20 mm in size) in form, and brittle. Specific gravity = 3.053, cubic, cleavages (100) and (110) perfect with (011) twin lamellae, parallel extinction, positive elongation, optically monoaxial positive, refractive index:  $n_o = 1.3760$  and  $n_e = 1.3858$ .

The chemical composition of sellaitite is:  $F_{60.33}$  and  $Mg_{39.67}$ , giving a formula of  $Mg_{1.03} F_2$ . Infrared spectral analysis under standard conditions shows that the main infrared absorption bands of sellaitite appear at 540, 470, 417 and  $274 \text{ cm}^{-1}$ . Its cell-unit parameters are:  $a_0 = 4.6215 \text{ \AA}$ ,  $c_0 = 3.0480 \text{ \AA}$ .

The formation of sellaitite seems to be related to the hydrothermal ore deposition of gold deposits. It is considered as one of the important pathfinding minerals for searching for this type of gold deposits.

# HIGH ENERGY PHYSICS

AUTHOR: ZHANG Yangzhung [4545 2254 1813]

ORG: Southwestern Institute of Physics, Leshan, Sichuan, China

TITLE: "A Scaling Law for the Anomalous Electron Transport in Tokamaks"

SOURCE: Beijing WULI XUEBAO [ACTA PHYSICA SINICA] in Chinese No 2, 1983  
pp 191-197

TEXT OF ENGLISH ABSTRACT: It is assumed in the paper that the dominant mechanism for the anomalous electron transport in Tokamaks is the renormalized electron magnetic drift wave driven by temperature gradient. A scaling law for the anomalous electron transport coefficient  $D^{(T)}$  has been derived by solving self-consistently the kinetic process, it reads

$$D^{(T)} = (c/\omega_{pe})^2 \{ \sqrt{(\nu_e/qR)^2/2\pi + (\nu_c/2)^2} - \nu_c/2 \}$$

It coincides in numerical values with the Alcator scaling law given by the Tokamak's experiments, and it agrees with the Ohkawa scaling law in the collisionless limit ( $\nu_c \rightarrow 0$ ). Furthermore, its deviation from the Alcator scaling law is analyzed, and the possibility of achieving the thermonuclear ignition for a high-field ohmically heating Tokamak is also discussed based on the scaling law.

CSO: 4009/21

AUTHOR: SHI Runchang [2457 3387 2490]  
 ZHENG Fei [6774 7378]  
 YIN Zhixiang [3009 1807 0686]  
 YAN Zhaoda [0917 0340 1129]  
 SHEN Hongquan [3088 1347 3123]  
 HU Zhangqi [5170 4545 0366]  
 ZHU Cuihan [2612 5050 3352]

ORG: Zhejiang University

TITLE: "Utilization of Lower Proof Alcohol (Ethanol) in Internal Combustion Engines"

SOURCE: Shanghai NEIRANJI GONGCHENG [CHINESE INTERNAL COMBUSTION ENGINE ENGINEERING] in Chinese No 3, 1983 pp 1-6

ABSTRACT: This paper discusses the applicable feasibility in internal combustion engines of lower proof (170-190 proof) alcohol, which is simpler in production process and lower in cost. Several methods of mixing alcohol with gasoline or diesel fuel are systematically described. Gasoline and diesel engines using alcohol-gasoline or alcohol-diesel mixtures respectively have been tested on rigs without or with little modification of the engine configuration; it indicates that the combustion efficiency and exhaust pollution are both improved by using such kinds of blended fuel, and the economic benefit is significant if the mixing ratio of alcohol to gasoline or diesel keeps within 8-20 percent in weight.

AUTHOR: FU Yaoxian [0265 5069 0341]  
 FU Weiai [0265 4850 1947]  
 XU Shiming [1776 6108 7686]  
 PENG Ying [1756 3853]

ORG: Shanghai Institute of Metallurgy, Chinese Academy of Sciences

TITLE: "A New Technique for Manufacturing Al5 Compound Superconducting Materials: Tube With High-tin the Central Diffusion of the Micro Multifilamentary Nb/Cu Extruded Composite"

SOURCE: Beijing DIWEN WULI [ACTA PHYSICA TEMPERATURAE HUMILIS SINICA] in Chinese No 3, 1983 pp 256-259

TEXT OF ENGLISH ABSTRACT: We have developed a new technique for manufacturing Al5 compound superconducting materials, namely, the technique of micro-multifilamentary Nb/Cu extruded composite tube with high-tin central diffusion, or for short, MMF Nb/Cu extruded tube with central diffusion. With this technique, the overall critical current density of a typical sample reacted at 700°C for 24 hours at 6.0T (transverse) and 4.2 K is  $3.2 \times 10^5$  A/cm<sup>2</sup>. The critical temperature of the same sample is 17.53 K.

LASERS

AUTHOR: Gu Huizhen [7357 1920 3791]  
LI Mingheng [2621 0682 3801]

ORG: Nondestructive Testing Institution of Chinese Mechanical Engineering Society

TITLE: "The Application of Laser Holography to NDT of Thin-wall Metal Cylinders"

SOURCE: Shanghai WUSUN JIANCE [NONDESTRUCTIVE TESTING] in Chinese No 5, 1983 pp 34-36

TEXT OF ENGLISH ABSTRACT: The paper introduces the application of laser holography in nondestructive testing of thin-wall metal cylinders and gives some photographs of holographic interferograms. At the same time, holograms got by using different systems and methods and the effect on the sensitivity in inspecting cracks are discussed. Moreover, it describes the advantages of the application of laser holography to NDT [nondestructive testing].

AUTHOR: XU Yongchen [1776 3057 7115]  
DING Hai [0002 0075]  
GUAN Yongmin [4619 3114 3046]

ORG: None

TITLE: "The Longitudinal Mode Selection for a Home-made Ar-Laser"

SOURCE: Shanghai TONGJI DAXUE XUEBAO [JOURNAL OF TONGJI UNIVERSITY] in Chinese No 4, 1983 pp 73-78

TEXT OF ENGLISH ABSTRACT: A Chinese made Ar-laser is successfully operated for the first time in a single longitudinal mode. This is accomplished by using a method of setting up the etalon inside the resonant cavity. The bandwidth of the single-mode line maintains around 90 MHz during an operating period of several hours. The output power of the laser for the single longitudinal mode is 35 percent of that for the multimode. These results indicate that the operation is nearly as good as that of a foreign product.

CSO: 4009/44



MEDICINE

AUTHOR: ZHAO Yulan [6392 3768 5695] et al.

ORG: Institute of Basic Medical Sciences, WHO Collaborating Center for Research and Training in Immunology, Beijing

TITLE: "Preliminary Report on Preparation of Monoclonal Antibody Against E Receptor"

SOURCE: Beijing ZHONGGUO YIXUE KEXUEYUAN XUEBAO [ACTA ACADEMIAE MEDICINAE SINICAE] in Chinese No 1, 15 Feb 84 pp 73-74

TEXT OF ENGLISH ABSTRACT: Studies on the E-rosette receptor have gained interest among immunologists recently, as it represents a unique parameter of human T cells which is readily isolated and identified. Hitherto, little work has been done on the monoclonal antibody against porcine E-rosette, but we have now obtained two antibodies which can combine with these receptor-carrying lymphocytes, as shown by an indirect immuno-fluorescence test as well as the inhibition of E-rosette formation of ovine red blood cells. From two successful fusion experiments, two clones were found which possessed apparently specific characteristics as anti-E receptors. These demand further study.

AUTHOR: LU Changde [7129 7022 1795] et al.

ORG: Shanghai Institute of Biochemistry, AS, et al.

TITLE: "Analysis of Human Leucocyte Interferon"

SOURCE: Beijing ZHONGGUO YIXUE KEXUEYUAN XUEBAO [ACTA ACADEMIAE MEDICINAE SINICAE] in Chinese No 1, 15 Feb 84 pp 1-4

TEXT OF ENGLISH ABSTRACT: Plasmid p8218 is obtained by cloning human umbilical leucocyte interferon gene into vector pBR322 at PstI site. Analysis with restriction endonucleases indicates that the number and site of restriction endonucleases at IFN gene in p8218 are the same as IFN- $\alpha$ D. Partial DNA sequencing also indicates that the sequence of one fragment of IFN gene in p8218 is the same as the sequence of a corresponding fragment of IFN- $\alpha$ D. So the human leucocyte interferon gene in p8218 belongs to the  $\alpha$ D subtype. According to the restriction endonuclease map, the interferon gene and the ampicillin-resistant gene in p8218 are transcribed in the same direction.

CSO: 4009/59